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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/405,176	09/24/1999	HIROYUKI SHINBATA	35.C13853	9205

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EXAMINER

KIM, CHONG R

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 07/29/2003

19

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/405,176

Applicant(s)

SHINBATA, HIROYUKI

Examiner

Charles Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 16, 19 and 22-33 is/are pending in the application.
- 4a) Of the above claim(s) 22-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 16 and 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 30 October 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Prosecution Application

1. The request filed on May 28, 2003 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/405,176 is acceptable and a CPA has been established. An action on the CPA follows.

Response to Amendment and Arguments

2. Applicant's amendment filed on May 2, 2003 has been entered and made of record.
3. Applicant's arguments have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

Applicants argue (page 7) that Kido et al. fail to teach the step of deleting a passing through area from the image. The Examiner disagrees. Kido extracts the irradiation field region from the image thereby deleting the remaining area in the image. What remains is the irradiation field region from which he performs the projection processing. For example, Kido explains that the processing is performed in the extracted irradiation field region of the image, the number of pixels which has been reduced (col. 12, lines 23-27). The Examiner notes that reducing the number of pixels is interpreted as being analogous to deleting an area of the image.

Applicants further argue (page 8) that Kido et al. fail to teach the step of preparing a projection of the image obtained in the deleting step, but merely discloses "that a concerned area is recognized using local maximum and local minimum in the projection of the longitudinal and lateral directions". The Examiner disagrees. Kido explains that the irradiation field region is

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extracted from the image (thereby deleting the remaining area) as noted above, and the concerned region detection is performed only on the extracted irradiation field image data (the image obtained in deleting/extracting step) [col. 2, lines 18-22]. The concerned region detection is performed using the local maximum and local minimum in the projection of the longitudinal and lateral directions (col. 1, line 65-col. 2, line 1). Therefore, the “projection of the longitudinal and lateral directions” is a projection of the image data in the extracted irradiation field image region (the image obtained in deleting/extracting step).

Kido further explains that in figure 17, the projection is obtained from the entire radiation image, “projection is made while the stopping-down portion is included” (col. 2, lines 4-9). Kido teaches that this projection of the entire image results in it being “impossible to correctly recognize the lung field region”. Therefore, Kido explains that in order to solve the problem, the irradiation field region is previously extracted from the image, and the concerned region detection (preparing a projection) are conducted only in accordance with the image data in the irradiation field (col. 2, lines 18-22).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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4. Claims 1, 7, 16, 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Kido et al., U.S. Patent No. 5,732,149 ("Kido").

Referring to claim 1, Kido discloses a method adapted for setting an area in a radiation image obtained by radiographing an object comprising the steps of:

- a. deleting a passing through area from the radiation image (col. 2, lines 18-19).

Kido explains that the irradiation field region from the image is extracted, thereby deleting the remaining area in the image. What remains is the irradiation field region from which he performs further processing. For example, Kido explains that the processing is performed in the extracted irradiation field region of the image, the number of pixels which has been reduced (col. 12, lines 23-27). The Examiner notes that reducing the number of pixels is interpreted as being analogous to deleting an area of the image.

- b. preparing a projection of the image obtained in the deleting step (col. 2, lines 18-22). Kido explains that the irradiation field region is extracted from the image (thereby deleting the remaining area) as noted above, and the concerned region detection is performed only on the extracted irradiation field image data (the image obtained in deleting/extracting step) [col. 2, lines 18-22]. The concerned region detection is performed using the local maximum and local minimum in the projection of the longitudinal and lateral directions (col. 1, line 65-col. 2, line 1). Therefore, the "projection of the longitudinal and lateral directions" is a projection of the image data in the extracted irradiation field image region (the image obtained in deleting/extracting step).

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c. setting an area in the radiation image based on the projection (col. 1, line 65-col. 2, line 3). Kido explains that the area (concerned region) is set using the local maximum and local minimum in the projection of the image.

Referring to claim 7, Kido further discloses extracting a pixel value characteristic (histogram) from the area (lung field region), and performing a gradation conversion processing of the radiation image based on the pixel value characteristic (col. 2, lines 1-4).

Claim 16 recites an apparatus which corresponds to the method of claim 1. Arguments analogous to those presented above with respect to claim 1 are applicable to claim 16. The apparatus for performing Kido's method is inherent in his teaching.

Claim 19 recites a computer-readable recording medium on which a program for extracting a characteristic amount of a photographed image is recorded, which corresponds to claim 1. Arguments analogous to those presented above with respect to claim 1 are applicable to claim 19. While Kido does not appear to explicitly mention a computer-readable recording medium on which a program is recorded, this would have been clearly obvious in light of his disclosure. Note, for example, Kido discloses a CPU (col. 8, lines 8-10), thereby establishing his system as being or relating to a computer-based system.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al., U.S. Patent No. 5,732,149 ("Kido"), further in view of Nakao et al., U.S. Patent No. 6,035,064 ("Nakao").

Referring to claim 2, Kido fails to include a step of binarizing the image obtained in the deleting step, and preparing a projection of the binarized image.

However, preparing a projection of binarized images was very common in the art. For example, Nakao discloses a step of that binarizes an image (col. 4, lines 1-3), and prepares a projection of the binarized image (col. 4, lines 24-26 and figure 10a).

Therefore, since both Kido and Nakao are both concerned with extracting a characteristic amount of an image by a projection, it would have been obvious to modify the preparing step of Kido, in order to prepare a projection of an image that has been binarized, as taught by Nakao, so that the image data can be simplified for quicker processing (Nakao, col. 6, lines 44-47).

6. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al., U.S. Patent No. 5,732,149 ("Kido"), further in view of Kanebako et al., U.S. Patent No. 5,680,471 ("Kanebako").

Referring to claim 3, Kido fails to include a weighting processing that is performed based on a pixel value of the image

However, Kanebako discloses a weighting processing that is performed based on a pixel value of the image (col. 11, lines 5-13).

Therefore, since both Kido and Kanebako are both concerned with extracting a characteristic area from a photographed X-ray image, it would have been obvious to modify the

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preparing step of Kido, to include the weighting processing as taught by Kanebako, in order to extract an area based on the threshold that is determined by the weighting processing (Kanebako, col. 11, lines 5-10 and lines 29-30) to improve the extraction of this area from the background.

Referring to claim 4, Kanebako further discloses a weighting processing as described above, that is performed based on a pixel position of the image (col. 14, lines 31-32).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al., U.S. Patent No. 5,732,149 ("Kido"), further in view of Doi et al., U.S. Patent No. 6,011,862 ("Doi").

Referring to claim 5, Kido fails to teach that the characteristic area is set based on the secondary difference values of the projection.

Doi teaches a step of setting a characteristic area of an image based on the secondary difference (derivative) values of the projection (profile) (col. 9, lines 45-60 and figure 7. Note that the ribcage edge points in figure 7 are interpreted to mean a characteristic area).

Kido and Doi are both concerned with analyzing the pixel value characteristic of radiation images. Doi's method provides a simple and accurate method of determining the edges of the ribcage in the lung region of the image. Kido's characteristic area is interpreted as the lung field region of the image, as disclosed above. Therefore, it would have been obvious to modify Kido's setting step so that the area is set based on the secondary difference values of the projection as taught by Doi, in order to improve the detection of the concerned regions in the radiation image.

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8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al., U.S. Patent No. 5,732,149 ("Kido").

Referring to claim 6, Kido further discloses photographing a thoracic vertebrae (col. 14, line 62 and figure 14d). Although Kido does not explicitly include photographing a cervical vertebra, it would have been obvious to photograph a cervical vertebrae instead of a thoracic vertebrae, since both a cervical and thoracic vertebrae are parts of a human body that are commonly X-rayed for medical diagnosis purposes.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Monday thru Thursday 8:30am to 6:00pm and alternating Fridays 9:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

ck
ck
July 21, 2003


Jon Chang
Primary Examiner